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SUBJECT : Chlorobenzylbenzene Environmental Testing

REFERENCE :

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Per our recent phone conversation, I am documenting our observations and recommendations on environmental testing of chlorobenzylbenzenes. These products will obviously be subjected to intense scrutiny by environmentalists and regulatory agencies because they are chlorinated hydrocarbons and are intended as PCB replacements.

We have conducted primary and ultimate biodegradation testing of a large number of benzylbenzenes substituted on one ring. In general, primary degradation was rapid and ultimate degradation (complete conversion to carbon dioxide and water) was dependent on the type, position and number of substituents. Significant ultimate degradation was observed for most mono- and dichlorinated benzylbenzenes. The dominant metabolic pathway appears to be formation of substituted phenylacetic acids. The biodegradation characteristics of trichlorobenzylbenzenes have not been adequately determined.

A significant body of literature exists on the toxicological and environmental behavior of chlorophenylacetic acids. The 2,3,6-trichlorophenylacetic acid, trademarked Fenac, is a commercially available herbicide. We have a few published references on these compounds, but have not carried out a comprehensive literature search.

A rat bioaccumulation study is in progress for MCS 1558, 1560, and 1826. We have analyzed tissue residues through day 10 of the feeding portion of the study. The ten-day residues are 0.5-1.3 ppm for rats fed 50 ppm in the diet and 5.8-13 ppm for rats fed 500 ppm. These initial values are much lower than corresponding concentrations from PCB feeding studies. These studies should be completed in January or February, depending on how quickly the rats eliminate accumulated residues during the depuration interval.

The 1977 test program proposed by DMEH includes C^{14} rat metabolism and C^{14} fish residue studies. Since radiolabeled products will be available, we recommend using them to conduct several in-depth degradation studies. Included would be activated sludge, natural water die-away and soil biodegradation experiments in addition to photodegradation in aqueous solution. Special attention would be focused on monitoring the fate of metabolites as well as the parent compounds. In addition, we should determine the bioconcentration potentials by the partition coefficient approach, for correlation with the fish residue studies. The fish residue studies should include analytical characterization of the residues.

Jim

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